

REMARKS

In view of the above amendments and the following remarks, Applicant requests favorable reconsideration of the above-identified application.

Claims 1-24 are now pending in this application, with Claims 1, 5, 9, 12, 15, 18, and 24 being independent. By this Amendment, Applicant has amended Claims 1, 5, 9, 12, 15, and 18, and added Claim 24.

Figure 1 stands objected to because it is not labeled as "Prior Art." Accompanying this Amendment is a Request for Approval to Amend the Drawings in which Applicant requests permission to amend Figure 1 as required.

Claims 1-4 stand rejected under 35 U.S.C. § 102 over U.S. Patent No. 5,696,373 (Fukui et al.). Claims 5-23 stand rejected under 35 U.S.C. § 103 over the Fukui et al. patent in view of U.S. Patent No. 5,568,337 (Eguchi). Applicant traverses these rejections.

As generally recited in each of the independent claims, Applicant's invention is generally directed to a grating interference encoder having a diffraction grating, an annular grating, and a photosensor. The diffraction grating generates two diffracted light beams, having different orders, by being irradiated by a coherent light beam from an illuminating optical system. The annular grating deflects the two diffracted light beams having the different orders to cause the deflected light beams to be reprojected onto the diffraction grating. The photosensor receives a light beam, obtained by interfering the rediffracted light beams with each other.

With such a configuration, the present invention employs an annular-type diffraction grating in a novel manner. In particular, the use of the annular-type grating may correct shifts of the optical path with respect to the scale portion and head portion of an interference device. Conventionally, a cat's eye lens has been used to achieve this

objective, hampering the reduction in size of the overall device and reducing the efficiency of alignment shifts. The present invention may be used to overcome these problems.

The Fukui et al. patent is directed to an optical encoder with dual diffraction grating. The Office Action cites this patent as describing an annular grating (movable plate 21) for deflecting two diffracted light beams in a manner similar to the claimed invention. However, Applicant notes that the specification of that patent describes movable plate 21 as a grating with grooves parallel to the grooves of fixed plate 22 (col. 20, lines 60-63). Accordingly, because the grooves of the two plates are stated to be parallel, the specification suggests against moveable plate 21 being an annular-type grating. Thus, the system in the Fukui et al. patent would not achieve the benefits of the present invention.

The Eguchi et al. patent is directed to the specifics of a condenser to be used with an encoder device. Applicant submits that this document fails to remedy the deficiencies discussed above with respect to the Fukui et al. patent.

Accordingly, Applicant submits that the Fukui et al. and Eguchi et al. patents, taken alone or in combination, fail to disclose or suggest at least the features of a grating interference encoder having an annular grating for deflecting two diffractive light beams having different orders generated from a diffraction grating to cause the deflected light beams to be reprojected onto that diffraction grating, as generally recited in each of the independent claims.

For the foregoing reasons, Applicant submits that the independent claims are distinguishable over the applied documents, whether those documents are taken alone or in combination, and requests withdrawal of the rejections under 35 U.S.C. §§ 102 and 103.

The remaining claims in the present application are dependent claims which depend from the independent claims, and thus are patentable over the documents of record for the reason noted above with respect to the independent claims. In addition, each recites

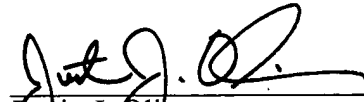
features of the invention still further distinguishing it from the applied documents.

Applicant requests favorable and independent consideration thereof.

Applicant submits that this application is in condition for allowance, and respectfully requests a Notice of Allowance.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,


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